STORAGE AND RETRIEVAL OF INFORMATION IN AEROSPACE MEDICINE

The Matrix Approach

Space Medicine
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NASA's Office of Space Medicine, working with the Lovelace Foundation, Harvard's Guggenheim Center for Aerospace Health and Safety, Bellcomm, Inc., and a number of consultants, has recently prepared a Compendium of Human Responses to the Aerospace Environment. The Compendium--over 4,000 pages, published in four volumes--is an ambitious attempt to make space medical information readily available.

When this effort was initiated some four years ago, it was decided to prepare a systematic and comprehensive approach plan to assure adequate coverage of all relevant areas and to facilitate organization of the information for easy storage and retrieval. Accordingly, a matrix was developed by G. Hoover,[1] which covers 58 environmental factors and 142 physiological-psychological functions.

The resulting 8,236 intersections have been coded by E. Roth[2] according to the following criteria:

Code 0 — Empirical and theoretical factors regarding the relationship are unknown.

Code 1 — The environmental parameter is critical to human function in the Apollo Project.

Code 2 — The environmental parameter is not critical to human function in the Apollo Project but may be in future manned space projects.

Code 3 — The environmental parameter does not appear to be critical or applicable to human function in Apollo or in future missions.

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1. Consultant to the Lovelace Foundation, Albuquerque, New Mexico.
2. At the time, E. M. Roth was with the Lovelace Foundation.

The word "critical" is defined in the present sense as requiring quantification of human tolerance limits and optimization of the interaction in space missions.

Over a four-year period, certain advantages and limitations of the matrix approach became apparent. The matrix was found very valuable for planning a systematic effort, for checking the completeness of information, for identification of information gaps and of research requirements. Insofar as storage and retrieval of information are concerned, the matrix can serve as a locator of information. The user can request specific information such as the effect of $+G_X$ acceleration on cardiac output. Using the matrix, this can easily be extended from the environmental point of view to the effect of any type of acceleration on cardiac output; or it can be extended from a physiological point of view to the effect of $+G_X$ acceleration on the total cardiovascular system. A quick look at the matrix shows also what other factors could affect cardiac output or which physiological changes could be caused by G_X acceleration. Clearly, the matrix can be a versatile tool for definition of specific information requirement and for retrieval of information of all types and of any degree of specificity.

Originally, one of the main purposes in developing the matrix was to facilitate storage and retrieval of information. Actually, it was used to assure complete coverage of the field and to detect loopholes of information. But it was not used as an approach plan to the document, because of problems handling the immense volume of material.

Two approaches to the utilization of the matrix were considered. One would employ the Compendium as it is now. Page references would lead the user from the matrix to the relevant material in the Compendium. These page references would be inserted directly into the matrix intersections. However, some matrix intersections require many page references, while others may contain none at all, if relevant information is lacking. But the size of all intersections has to be the same, i.e., it has to be determined by the one with the greatest demand for space. This means that the size of the matrix would have to be increased considerably. An additional problem arises if the desired information covers several intersections, as some of the page references will be repetitive.

Some of these difficulties can be eliminated by organizing the Compendium in accordance with the matrix intersections. Frequently, information will have to be repeated, if it is relevant to many intersections. This system is clumsy, but excellent if the user wants specific information. If the information requirement covers a number of intersections, much of the information will be duplicated.

The traditional "Word Index" has also the problem of repetitive references when the desired information covers a wide area. In addition, the word index does not indicate other related information; it does not provide the means of narrowing the information requirement down to specific items or widening it into broader fields as it can easily be done by use of the matrix. The main advantage is "familiarity."

This state of affairs is obviously unsatisfactory. None of the current approaches to information storage and retrieval are suitable to a project like the Compendium. For the future, we have to look for a different approach and that appears to be the combination of matrix and computer. The matrix provides the organization. The information requirement can be expressed in the right terms and the scope can be defined. Computer storage of the information makes it possible to update data at any time, to increase the volume of information as required, and to retrieve information of any scope without repetition. Use of a computer also permits extension of the matrix in a third dimension. If this third dimension were "Mission Tasks," the matrix would provide an approach to information in three broad areas:

1. Effect of the environment on physiological-psychological function.

2. Effect of the environment on task performance.

3. Interaction between physiological-psychological function and task performance.

Summary - A detailed matrix was prepared as a systematical approach to the study of the "Effect of the Space Environment on Physiological-Psychological Function." The matrix is considered valuable to:

a. check for completeness of an endeavor in this area or any given fraction of this area;

b. adjust terminology and scope of an inquiry such that the answer will be as concise and relevant as possible; and,

c. provide a tool for future, computer-based storage and retrieval systems in the field of aerospace medicine.

PSYCHOLOGICAL/ PHYSIOLOGICAL PARAMETERS

ENVIRONMENTAL PARAMETERS

No.	Environmental parameter	Vol.	Std.	01 Growth and Aging	02 Healing and Repair	03 Genetics & Carcinogenesis	04 Acuity	05 Spectral Sensitivity	06 Visual Fields	07 Contrast Threshold	08 Dark Adaptation	09 Depth Perception	10 Color Discrimination	11 Flash Blindness (Dazzle)	12 Occulomotor	13 Intensity-spectrum, T'resh	14 Difference Thresholds	15 Speech Perception	16 Noise Adaptation	17 Tone Sensitivity	18 Sensitivity Spectrum	19 Adaptation	20 Sensitivity Spectrum	21 Adaptation	22 Skin Reactions	23 Temperature Sensation	24 Touch Sensation	25 Pain Sensation	26 Pulmonary Circuit	27 Cardiac Output	28 Heart Rate	29 Heart Rhythm	30 Blood Pressure	31 Peripheral Vasculature	32 Vasomotor Control	33 Blood Distribution
	PARAMETER (group)			Tissue			Vision									Audition					Smell		Taste		Integument System				Cardiovascular Function							
01	Electromagnetic Environment – Microwave Radiation	I	1	3	0	0	2	0	3	2	2	3	0	3	3	3	3	3	3	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
02	Electromagnetic Environment – Light – Visible	I	2	2	0	3	1	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
03	Electromagnetic Environment – Light – Ultraviolet	I	2	2	2	3	1	0	3	1	3	3	2	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	3	2	2	3	2	2	2	2
04	Electromagnetic Environment – Ionizing Radiation – X-ray	I	3	2	1	1	1	2	1	1	2	1	2	2	2	2	2	1	3	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1	1	1
05	Ionizing Radiation – Gamma Ray	I	3	2	1	1	1	2	1	1	2	1	2	2	2	2	2	1	3	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1	1	1
06	Ionizing Radiation – Beta Ray (electrons)	I	3	2	1	1	1	2	1	1	2	1	2	2	2	2	2	1	3	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1	1	1
07	Ionizing Radiation – Protons	I	3	2	1	1	1	2	1	1	2	1	2	2	2	2	2	1	3	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1	1	1
08	Ionizing Radiation – Neutrons	I	3	2	1	1	1	2	1	1	2	1	2	2	2	2	2	1	3	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1	1	1
09	Ionizing Radiation – Alpha Particles	I	3	2	1	1	1	2	1	1	2	1	2	2	2	2	2	1	3	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1	1	1
10	Ionizing Radiation – Heavy Nuclei	I	3	2	1	1	1	2	1	1	2	1	2	2	2	2	2	1	3	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1	1	1
11	Ionizing Radiation – Strange Particles	I	3	2	1	1	1	2	1	1	2	1	2	2	2	2	2	1	3	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1	1	1
12	Electromagnetic Environment – Magnetic Fields	II	4	2	2	2	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0
13	Electromagnetic Environment – Electric Currents	II	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
14	Therm. Env. – Heat	II	6	2	1	0	1	1	1	1	1	1	1	1	3	3	3	3	3	3	0	0	2	2	1	1	1	1	3	1	1	1	1	1	1	1
15	Therm. Env. – Cold	II	6	2	1	0	3	0	3	3	3	3	3	3	3	3	3	3	3	3	0	0	2	2	1	1	1	1	3	1	1	1	1	1	1	1
16	Gravitational Environment – Linear Acceleration – $+G_x$	II	7	2	0	0	3	3	0	0	0	0	3	0	1	0	0	0	3	0	3	3	3	3	2	2	2	2	1	1	1	1	2	1	1	1
17	Linear Acceleration – $+G_y$	II	7	2	0	0	3	3	0	0	0	0	3	0	1	3	3	0	3	0	3	3	3	3	2	2	2	2	1	1	1	1	2	1	1	1
18	Linear Acceleration – $+G_z$	II	7	2	0	0	1	1	1	1	1	1	1	1	1	3	3	0	3	0	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1
19	Linear Acceleration – $-G_x$	II	7	2	0	0	1	3	0	0	0	0	3	0	1	3	3	0	3	0	3	3	3	3	2	2	2	2	1	1	1	1	2	1	1	1
20	Linear Acceleration – $-G_y$	II	7	2	0	0	3	3	0	0	0	0	3	0	1	3	3	0	3	0	3	3	3	3	2	2	2	2	1	1	1	1	2	1	1	1
21	Linear Acceleration – $-G_z$	II	7	2	0	0	1	1	1	1	1	1	1	1	1	0	0	1	3	1	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1
22	Linear Acceleration – Impact	II	7	0	1	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	1	3	1	1	1	1	1	1	1	1	1	1
23	Rotary Accel. – $R_{x,y}$ tumbling	II	7	2	0	0	1	1	0	1	0	1	1	1	1	0	0	0	3	0	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1
24	Rotary Accel. – R_z spin	II	7	2	0	0	1	1	0	1	0	1	1	1	1	0	0	0	3	0	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1
25	Coriolis Factors	II	7	2	0	0	1	0	0	0	0	0	0	0	1	3	3	0	3	0	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1
26	Subgravity	II	7	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	3	3	3	1	1	1	2	1	1	1	1
27	Zero Gravity	II	7	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	3	3	3	1	1	1	2	1	1	1	1
28	Oscil. – Vibration	III	8	2	2	1	1	3	2	3	3	2	3	3	1	1	1	1	1	1	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1
29	Oscil. – Sound and Noise	III	9	3	2	0	3	3	3	3	3	3	3	3	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	1	3	1	1	1	2
30	Barometric Environment – Humidity	II	4	2	1	3	1	3	3	1	3	3	2	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3
31	Partial Pressure – Oxygen-Energy	III	10	2	2	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
32	Partial Pressure – Carbon Dioxide	III	10	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1	1	1	1	1
33	Partial Pressure – Nitrogen	III	11	2	1	0	1	1	0	1	0	0	1	0	3	0	0	1	1	1	0	0	0	0	3	1	1	0	1	1	1	1	1	1	1	1
34	Partial Pressure – Helium	III	11	2	0	0	3	3	3	3	3	3	3	3	3	2	2	2	2	2	3	3	3	3	3	1	3	3	3	3	3	3	3	2	2	2
35	Partial Pressure – Neon	III	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	Partial Pressure – Trace Inert Gases	III	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	Total Pressure – Static Pressure	III	12	3	2	3	3	0	3	3	3	3	3	3	3	2	2	2	2	2	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3
38	Total Pressure – Decompression-Slow	III	13	3	1	3	1	1	1	1	1	1	1	2	2	1	1	1	1	1	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1
39	Total Pressure – " -Rapid	III	12	3	1	3	1	1	1	1	1	1	1	2	2	1	1	1	1	1	3	3	3	3	1	1	1	2	1	1	1	1	1	1	1	1
40	Total Pressure – Blast Overpressure	III	12	3	1	3	1	1	1	1	1	1	1	2	2	1	1	1	1	1	0	3	3	3	1	1	1	2	1	1	1	1	1	1	1	1
41	Contaminants – Vap. & Gas – Body Products	III	13	2	2	0	2	3	3	3	3	3	2	3	3	3	3	3	3	3	1	1	1	1	3	3	1	3	3	3	3	3	3	3	3	3
42	Contaminants – Vap. & Gas – Exogenous	III	13	2	1	0	1	3	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
43	Contaminants – Partic. & Aeros. – Body Products	III	13	2	2	0	2	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3
44	Contaminants – Partic. & Aeros. – Exogenous	III	13	2	1	0	1	3	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
45	Microbial Agents	III	13	2	1	1	1	3	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
46	Combined Contaminants	III	13	2	1	1	1	3	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
47	Nutrition – Carbohydrate	III	14	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
48	Nutrition – Protein	III	14	2	2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3
49	Nutrition – Fat	III	14	2	2	3	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
50	Nutrition – Vitamins	III	14	2	2	2	3	3	3	2	2	3	2	2	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2
51	Nutrition – Minerals	III	14	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1
52	Nutrition – Water	III	15	2	2	3	3	2	2	3	3	3	2	3	3	3	3	3	3	3	2	2	2	2	1	1	1	1	2	2	3	2	3	1	1	1
53	Temporo-Spatial – Anthropometry & Workspace	III	16	3	2	3	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	1	1	2	1	1	1	1
54	Temporo-Spatial – Isolation	III	16	3	2	3	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	3
55	Temporo-Spatial – Confinement & Restraint	III	16	3	2	3	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	1	1	2	1	1	1	1
56	Temporo-Spatial – Circadian & Work Cycles	III	16	3	2	3	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	2	2	2	2	2

No.	Environmental parameter	34 Lymphatic System	35 Blood Volume	36 Plasma	37 Formed Elements	38 Coagulation & Bleeding	39 Reticuloendothelium-Immune	40 Respiratory Rate	41 Lung Vols. and Ratios	42 Pulmonary Gas Exchange	43 Blood Transport of Gas	44 Peripheral Gas Exchange	45 Work of Breathing	46 Gas Flow	47 Compliance	48 Diaphragmatic Activity	49 Respiratory Control	50 Gas Storage	51 Food Utilization	52 Oxygen Consumption	53 CO_2 Production	54 Work Capacity SS	55 SP	56 SU	57 Work Efficiency SS	58 SP	59 SU	60 Sensible Heat Loss SS	61 SP	62 SU	63 Insensible Heat Loss SS	64 SP	65 SU	66 Temperature Regulation
	(group)		Blood					Respiration											Metabolism									Temperature Control						
01	Microwave Radiation	0	3	3	2	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2
02	Light – Visible	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	3	3	3	3	3	3	3
03	Light – Ultraviolet	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2
04	X-ray	1	1	1	1	1	1	2	2	2	2	1	1	1	1	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
05	Gamma Ray	1	1	1	1	1	1	2	2	2	2	1	1	1	1	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
06	Beta Ray (electrons)	1	1	1	1	1	1	2	2	2	2	1	1	1	1	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
07	Protons	1	1	1	1	1	1	2	2	2	2	1	1	1	1	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
08	Neutrons	1	1	1	1	1	1	2	2	2	2	1	1	1	1	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
09	Alpha Particles	1	1	1	1	1	1	2	2	2	2	1	1	1	1	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
10	Heavy Nuclei	1	1	1	1	1	1	2	2	2	2	1	1	1	1	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
11	Strange Particles	1	1	1	1	1	1	2	2	2	2	1	1	1	1	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Magnetic Fields	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Electric Currents	1	1	1	1	0	0	1	1	1	0	0	0	0	0	1	1	3	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	Heat	1	1	1	1	1	3	1	1	3	2	1	3	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	Cold	1	0	1	1	1	3	1	1	3	2	1	3	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	$+G_x$	1	2	1	2	3	3	1	1	1	2	2	1	1	1	1	1	2	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1
17	$+G_y$	1	2	1	2	3	3	1	1	1	2	2	1	1	1	1	1	2	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1
18	$+G_z$	1	1	1	2	3	3	1	1	1	2	2	1	1	1	1	1	2	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1
19	$-G_x$	1	2	1	2	3	3	1	1	1	2	2	1	1	1	1	1	1	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1
20	$-G_y$	1	2	1	2	3	3	1	1	1	2	2	1	1	1	1	1	1	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1
21	$-G_z$	1	2	1	2	3	3	1	1	1	2	2	1	1	1	1	1	1	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1
22	Impact	1	1	1	2	3	3	1	1	1	2	2	1	1	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
23	$R_{x,y}$ tumbling	1	2	1	2	3	3	1	1	1	2	2	1	1	1	1	1	2	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
24	R_z spin	1	2	1	2	3	3	1	1	1	2	2	1	1	1	1	1	2	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
25	Coriolis Factors	1	2	1	2	3	3	1	1	1	2	2	2	1	1	1	1	2	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
26	Subgravity	2	1	1	1	3	0	3	0	3	3	3	0	3	2	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
27	Zero Gravity	2	1	1	1	3	0	3	0	3	3	3	0	3	2	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
28	Vibration	0	1	2	1	3	3	1	2	2	3	2	1	1	1	1	1	3	3	2	2	1	1	1	1	1	1	2	2	2	2	2	2	2
29	Sound and Noise	3	3	3	3	3	3	1	2	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
30	Humidity	3	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1
31	Oxygen-Energy	3	3	3	3	3	3	3	3	3	1	1	2	1	1	3	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
32	Carbon Dioxide	2	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
33	Nitrogen	2	0	1	1	0	0	1	0	1	1	1	2	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
34	Helium	3	3	2	3	3	3	3	3	3	1	1	1	1	1	3	3	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
35	Neon	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	Trace Inert Gases	0	0	0	0	0	0	0	0	1	1	1	0	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	Static Pressure	3	3	3	3	3	3	3	2	3	3	3	1	1	1	1	1	1	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1
38	Decompression-Slow	1	1	1	3	3	2	1	1	1	1	1	1	1	1	1	1	1	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
39	" -Rapid	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
40	Blast Overpressure	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
41	Vap. & Gas – Body Products	3	3	3	3	3	3	2	2	2	2	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
42	Vap. & Gas – Exogenous	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
43	Partic. & Aeros. – Body Products	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
44	Partic. & Aeros. – Exogenous	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
45	Microbial Agents	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
46	Combined Contaminants	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
47	Carbohydrate	3	3	2	3	3	1	3	3	3	3	2	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
48	Protein	3	3	2	2	3	1	3	3	3	2	2	3	3	3	2	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
49	Fat	3	3	2	3	2	1	3	3	3	3	2	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50	Vitamins	3	3	2	2	2	2	3	3	3	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
51	Minerals	2	1	1	2	2	1	1	3	2	2	2	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
52	Water	1	2	1	1	2	2	1	1	3	2	3	2	2	3	2	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
53	Anthropometry & Workspace	2	1	1	1	3	2	1	2	3	2	2	1	1	1	1	2	3	3	2	2	1	1	1	1	1	1	3	3	3	3	3	3	3
54	Isolation	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
55	Confinement & Restraint	2	1	1	1	3	2	1	2	3	2	2	1	1	1	1	2	3	3	2	2	1	1	1	1	1	1	3	3	3	3	3	3	3
56	Circadian & Work Cycles	3	3	3	3	3	2	1	3	3	3	3	3	3	3	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1

No.	Environmental parameter	67 Comfort Limits SS	68 SP	69 SU	70 Heat Storage	71 Thirst & Water Intake	72 Urinary Output	73 Fecal Water	74 Sweat	75 Total Body Water	76 Extracellular Water	77 Intracellular Water	78 Acid-Base Balance	79 Na	80 K	81 Ca	82 P	83 N	84 Trace Elements	85 Gonadal and Sexual Function	86 Renal Function	87 Bladder Function	88 Parathormone	89 A.D.H.	90 Thyroxin	91 Catecholamines	92 17 Keto-steroids	93 Glucocorticoids	94 Mineralocorticoids	95 Insulin	96 Pituitary Hormones	97 Others	98 Oro-dental	99 Food Intake
	(group)					Fluid Balance-Water Metabolism							Electrolyte Balance							Genito-urinary			Endocrines										Gastrointestinal Function	
01	Microwave Radiation	2	2	2	2	3	3	3	2	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3		1	3
02	Light – Visible	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	2	3	2	2	3	3	3	3	2	0	2	2	0	3		2	2
03	Light – Ultraviolet	2	2	2	2	3	3	3	2	3	3	3	3	3	3	2	2	3	3	3	3	3	2	3	3	2	2	2	2	3	2		2	2
04	X-ray	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	1	1	1		1	1
05	Gamma Ray	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	1	1	1		1	1
06	Beta Ray (electrons)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	1	1	1		1	1
07	Protons	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	1	1	1		1	1
08	Neutrons	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	1	1	1		1	1
09	Alpha Particles	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	1	1	1		1	1
10	Heavy Nuclei	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	1	1	1		1	1
11	Strange Particles	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	1	1	1		1	1
12	Magnetic Fields	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0
13	Electric Currents	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	1	0	0	0	1	0	1	0	1	1	1	1	1	0		1	1
14	Heat	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	0	2	1	3	3	1	2	1	2	1	1	2	1		2	1
15	Cold	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	0	2	1	3	3	1	2	1	2	1	1	2	1		2	1
16	$+G_x$	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	1	1	2	1	3	1	2	1	2	1	1		3	2
17	$+G_y$	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	1	1	2	1	3	1	2	1	2	1	1		3	2
18	$+G_z$	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	1	1	2	1	3	1	2	1	2	1	1		3	2
19	$-G_x$	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	1	1	2	1	3	1	2	1	2	1	1		3	2
20	$-G_y$	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	1	1	2	1	3	1	2	1	2	1	1		3	2
21	$-G_z$	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	1	1	2	1	3	1	2	1	2	1	1		3	2
22	Impact	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	1	0	1	1	1	1	1	2	1	1	1	2	1	1		1	1
23	$R_{x,y}$ tumbling	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	1	1	3	1	3	1	2	1	2	1	1		3	2
24	R_z spin	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	1	1	3	1	3	1	2	1	2	1	1		3	2
25	Coriolis Factors	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	1	1	3	1	3	1	2	1	2	1	1		3	2
26	Subgravity	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	0	2	1	3	1	1	3	3	3	3	1	3	3		3	2
27	Zero Gravity	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	0	2	1	3	1	1	3	3	3	3	1	3	3		3	2
28	Vibration	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	3	3	2	2	1	3	0	3	1	3	1	0	3	1		1	2
29	Sound and Noise	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	2	3	3	3	3	3	1	3	1	3	3	2		3	2
30	Humidity	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	2	1	3	3	1	3	2	3	2	1	3	2		1	3
31	Oxygen-Energy	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		3	3
32	Carbon Dioxide	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	2	1	2	1	2	1	1	1	1		2	1
33	Nitrogen	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	3	0	1	0	1	1	0	1	1	1	1	1	1		0	1
34	Helium	1	1	1	1	1	2	2	1	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		3	3
35	Neon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
36	Trace Inert Gases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
37	Static Pressure	1	1	1	1	1	1	2	1	1	1	1	1	1	1	3	3	3	3	3	2	3	3	1	3	3	3	3	3	3	2		3	3
38	Decompression-Slow	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	1	3	3	1	3	3	3	3	1	2	1	2	2	1		1	1
39	" -Rapid	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	1	3	3	1	3	3	3	3	1	2	1	2	2	1		1	1
40	Blast Overpressure	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	3	1	1	1	2	0	3	1	1	1	2	2	1		3	1
41	Vap. & Gas – Body Products	2	2	2	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3		3	2
42	Vap. & Gas – Exogenous	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	2	1	1	1	1	2	1		1	1
43	Partic. & Aeros. – Body Products	2	2	2	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3		3	2
44	Partic. & Aeros. – Exogenous	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	2	1	1	1	1	2	1		1	1
45	Microbial Agents	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	2	1	1	1	1	1	1		1	1
46	Combined Contaminants	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1		1	1
47	Carbohydrate	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	3	2	1	3	3	2	2	2	2	1	2	1	1		2	1
48	Protein	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	3	2	1	3	3	2	1	2	2	1	2	1	1		2	1
49	Fat	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	3	2	1	3	3	2	2	2	2	1	2	1	1		2	1
50	Vitamins	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	2	2	2	2	2	3	2	1	3	2	2	2	2	2	2		2	1
51	Minerals	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	2	1		1	1
52	Water	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	3	2	1	1	1	1	3	1	2	1	1	2	1		1	1
53	Anthropometry & Workspace	3	3	3	3	2	2	3	2	2	2	2	2	2	2	1	1	1	3	2	1	1	3	3	3	1	1	1	1	3	1		3	1
54	Isolation	3	2	3	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	2	2	3	3	3	3	1	1	1	2	3	1		3	1
55	Confinement & Restraint	3	3	3	3	2	2	3	2	2	2	2	2	2	2	1	1	1	3	2	1	1	3	3	3	1	1	1	1	3	1		3	1
56	Circadian & Work Cycles	1	1	1	1	1	1	3	2	2	2	2	1	1	1	2	2	1	3	2	1	3	3	3	3	1	1	1	1	2	1		3	1

No.	Environmental parameter	100 Secretion	101 Absorption	102 Motility	103 Feces	104 Flatus	105 Nausea and Vomiting	106 Locomotor	107 Coordination & Dexterity	108 Reflex Action	109 Muscle Strength & Fatigue	110 Connective Tissue	111 Joint Function	112 Density of Bone	113 Bone Structure	114 Metabolism of Bone	115 Proprioceptive Sense	116 Spatial Orientation	117 Vibration Sense	118 Labyrinthine Function	119 Otolith Organ Function	120 State of Consciousness	121 Sleep & Circadian Rhythm	122 Alertness & Vigilance	123 Reaction Times	124 Tracking Function	125 Transfer Functions	126 Speech and Communication	127 Information Processing	128 Decision-Making	129 Learning and Retention	130 Emotional Stability	131 Motivation	132 Illusions and Hallucinations
	(group)							Neuro-Muscular Function				Skeletal Function					Kinesthetic & Vestibular Function					Behavior												
01	Microwave Radiation	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
02	Light – Visible	2	3	2	2	3	3	3	1	1	3	3	3	3	3	3	1	1	3	3	3	1	1	1	1	1	1	1	3	3	3	2	2	1
03	Light – Ultraviolet	3	3	3	3	3	3	3	3	2	3	3	3	1	1	1	2	1	3	3	3	3	3	3	1	1	1	1	3	3	3	2	2	3
04	X-ray	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
05	Gamma Ray	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
06	Beta Ray (electrons)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
07	Protons	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
08	Neutrons	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
09	Alpha Particles	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
10	Heavy Nuclei	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
11	Strange Particles	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Magnetic Fields	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
13	Electric Currents	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
14	Heat	2	2	1	2	3	1	1	1	1	1	1	2	3	3	3	2	2	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
15	Cold	2	2	1	2	3	1	1	1	1	1	1	2	3	3	3	2	2	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
16	$+G_x$	2	2	1	2	2	1	1	1	2	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	$+G_y$	2	2	1	2	2	1	1	1	2	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	$+G_z$	2	2	1	2	2	1	1	1	2	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19	$-G_x$	2	2	1	2	2	1	1	1	2	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	$-G_y$	2	2	1	2	2	1	1	1	2	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	$-G_z$	2	2	1	2	2	1	1	1	2	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	Impact	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	$R_{x,y}$ tumbling	2	2	1	2	2	1	1	1	2	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
24	R_z spin	2	2	1	2	2	1	1	1	2	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25	Coriolis Factors	2	2	1	2	2	1	1	1	2	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
26	Subgravity	0	0	0	3	3	0	1	1	1	1	1	1	1	1	1	1	1	3	0	1	0	3	0	2	1	1	3	3	3	3	3	3	2
27	Zero Gravity	0	0	0	3	3	0	1	1	1	1	1	1	1	1	1	1	1	3	0	1	0	3	0	2	1	1	3	3	3	3	3	3	2
28	Vibration	2	2	1	2	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
29	Sound and Noise	2	3	2	2	3	1	3	1	1	2	2	1	3	3	3	2	2	2	2	2	1	1	1	2	1	2	1	1	1	1	1	1	3
30	Humidity	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	2	2	3	3	2	2	2	2	3
31	Oxygen-Energy	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
32	Carbon Dioxide	1	1	1	1	1	1	1	1	1	1	3	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
33	Nitrogen	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
34	Helium	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3
35	Neon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
36	Trace Inert Gases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	Static Pressure	3	0	1	2	1	2	2	3	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
38	Decompression-Slow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
39	" -Rapid	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
40	Blast Overpressure	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
41	Vap. & Gas – Body Products	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	2	3	3	2	2	2	3	2	2	2	2	3
42	Vap. & Gas – Exogenous	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
43	Partic. & Aeros. – Body Products	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
44	Partic. & Aeros. – Exogenous	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
45	Microbial Agents	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
46	Combined Contaminants	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
47	Carbohydrate	1	1	1	1	1	2	1	1	2	1	1	3	3	3	3	3	3	3	3	3	2	2	1	2	2	2	2	2	2	2	2	2	2
48	Protein	1	1	1	1	1	2	1	1	2	1	1	3	1	1	1	3	3	3	3	3	2	2	1	2	2	2	2	2	2	2	2	2	2
49	Fat	1	1	1	1	1	2	1	1	2	2	2	3	1	1	1	3	3	3	3	3	2	2	1	2	2	2	2	2	2	2	2	2	2
50	Vitamins	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	0	3	2	2	2	2	2	2	2	2	2	2	2	2
51	Minerals	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0	1	1	1	1	1	1	1	1	1	1	1	1	2
52	Water	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	2	0	1	1	1	1	1	1	1	1	1	1	1	1	2
53	Anthropometry & Workspace	2	3	2	1	2	3	1	1	1	1	1	1	1	1	1	1	1	2	2	0	3	1	1	1	1	1	2	1	1	1	1	1	1
54	Isolation	2	3	2	1	3	3	1	2	2	3	3	3	3	3	3	1	1	3	3	0	3	1	1	2	1	1	2	1	1	1	1	1	1
55	Confinement & Restraint	2	3	2	1	2	3	1	1	1	1	1	1	1	1	1	1	1	2	2	0	3	1	1	1	1	1	2	1	1	1	1	1	1
56	Circadian & Work Cycles	1	2	1	1	2	3	1	1	1	1	1	1	1	1	1	1	1	2	2	0	3	1	1	1	1	1	2	1	1	1	1	1	1

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